

# UNITED STATES SIGNAL SERVICE

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### INTRODUCTION.

This REVIEW is based on reports for August, 1890, from 2,340 regular and voluntary observers. These reports are classified as follows: 168 reports from Signal Service stations; 121 reports from United States Army post surgeons; 5 reports of rainfall observations of the United States Geological Survey in Arizona and New Mexico; 1,498 monthly reports from state weather service and voluntary observers; 26 reports from Canadian stations; 151 reports through the Central Pacific Railway Company; 371 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine

reports through the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Weather and Crop Service, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Meteorological Report of the Missouri State Board of Agriculture, Nebraska, Nevada, New England, New Jersey, New York, North and South Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, and Texas, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

### CHARACTERISTICS OF THE WEATHER FOR AUGUST, 1890.

An important feature of the month was the West India cyclone which moved from east of the Windward Islands to northwest of Bermuda from the 27th to 31st, with winds of hurricane force and loss of life and shipping.

In the west part of the upper lake region and the upper part of the Mississippi Valley the month was the coldest, and at stations on the middle California coast and in the lower Rio Grande valley it was the warmest August on record. The greatest departures below the average temperature for August were noted in the upper Mississippi valley and thence northward to the British Possessions, where they exceeded 3°, and the greatest departures above the average occurred at Sydney, O. B. I., and San Francisco, Cal., where they exceeded 2°. The highest temperature reported by a regular station of the Signal Service was 110° at Yuma, Ariz., and by a voluntary observer 120° at Volcano Springs, Cal. The lowest temperature reported by a regular station of the Signal Service was 30° at Saint Vincent, Minn., and by a voluntary observer 24° at Alma, Colo., and Bonanza, Idaho. Killing frost occurred on the 16th in Saint Lawrence Co., N. Y.; on the 22d at Saint Vincent, Minn., and Saint Lawrence, S. Dak.; on the 23d at Manton, Mich.; and on the 24th at Alpena, Mich. The frost of the 16th in Saint Lawrence Co., N. Y., was about one month earlier; that of the 22d at Saint Vincent, Minn., was about 10 days earlier; that of the 22d at Saint Lawrence, S. Dak., was about two weeks earlier; and that of the 23d at Manton, Mich., and of the 24th at Alpena, Mich., was about one week earlier than the average date of first killing frost in the respective localities.

The rainfall was unevenly distributed over the interior and eastern parts of the country, and large excesses and marked deficiencies occurred in limited and irregularly distributed areas. The greatest excess occurred in west-central Arkansas, where it exceeded 8.00 inches at Fort Smith, nine years record. In the middle Saint Lawrence valley the excess above the average for August was more than 5.00 inches at Montreal, and more than 4.00 inches at Quebec, and on the south-central coast of Nova Scotia, on the immediate Atlantic coast from Norfolk, Va., to Atlantic City, N. J., and in the Mississippi Valley from Vicksburg, Miss., to Cairo, Ill., it was more

than 3.00. The greatest deficiency occurred on the Georgia and east-central and extreme west Florida coasts, where it was more than 4.00 inches, and the deficiency exceeded 2.00 inches at stations on the south New England coast, along the south Atlantic and Florida coasts, and in the lower Rio Grande, upper Mississippi, and Missouri valleys. At stations in New Hampshire and Vermont, at Statesburgh, S. C., in west-central Arkansas, east-central Colorado, and in the south and west parts of the southern plateau the rainfall was the heaviest ever reported for August. On the north Pacific coast the rainfall was about one-half greater, and in the Ohio Valley and Tennessee, the southern plateau, and the middle Atlantic states it was one-fourth to one-half greater than the average; while on the south Pacific coast about one-fifth, in the Rio Grande Valley about one-fourth, and at Key West, Fla., in the northern plateau, the Missouri Valley, extreme northwest, and in the south Atlantic states two-fourths to three-fourths of the usual amount of rainfall was reported. Light snow flurries were reported along the upper Saint Marie River, Mich., on the 9th, and in Dauphin, Northampton, and Northumberland counties, Pennsylvania, on the 23d.

Destructive storms were reported in Kentucky on the 1st; in North Carolina, Virginia, and Iowa on the 2d; in Iowa, southern Minnesota, South Dakota, central and east-central Wisconsin, Michigan, Indiana, and New York on the 3d; in Michigan and Arizona on the 4th; in southern California and New Brunswick on the 5th; in Iowa on the 6th; in Minnesota and Arizona on the 7th; in Michigan, Wisconsin, and Florida on the 8th; in Tennessee on the 9th; over Long Island Sound, and in New Jersey, New York, and South Dakota on the 10th; in east-central Colorado on the 14th; in Missouri on the 16th; and in Ohio on the 17th. On the 19th a destructive tornado occurred at Wilkes Barre, Pa., killing sixteen persons, and destroying property to the value of about \$600,000. Destructive storms occurred in central Texas on the 20th; and in Maryland, Pennsylvania, and New York on the 21st. A storm presenting the characteristics of a tornado of limited energy occurred near Hiram, Ohio, on the 21st. Destructive storms occurred in Kentucky, Tennessee, Ohio, West Virginia, and western Pennsylvania on the 26th; in Michigan on the 28th;